REMARKS

This is in response to the Office Action that was mailed on November 22, 2002. Claim 1 is amended to define the laminate embodiment with recitations from claims 5, 8, and 10-12. Claim 1 is amended to define the porous support with a recitation from claim 15; see also lines 11-12 on page 19 and lines 9-10 on page 23 of the specification. Also, minor formal amendments have been made to some of the claims. No new matter is introduced by this Amendment. Claims 1, 3, 4, 6, 7, 9, 13, 14, 16, and 17 are in the case.

Claims 1, 3-8 and 10-17 were rejected, under the second paragraph of 35 U.S.C. 112, as failing to define the invention properly. Claim 1 has been further amended to make it clear that the porous layer of the invention can be self-standing (a porous support) or can be supported (in the form of a laminate) on a substrate. This situation is reflected in the Examiner's "fig. B". It is respectfully submitted that the claims as amended herein satisfy the requirements of the statute.

Claims 1 and 3-17 were rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,177,181 (Hamada), US 5,445,868 (Harasawa), and US 6,300,260 (Iwasa). The rejection is respectfully traversed.

Hamada discloses a porous membrane comprising at least one polymer selected from the group consisting of cellulose derivatives, vinyl-series polymers, and polysulfone-series polymers, and showing a light transmittance of not less than 30%

at the wavelength 400 nm (claim 1) and a recording sheet which comprises a substrate, an ink-absorbing layer formed on at least one side of said substrate, and a porous polymer layer having a micro phase separation structure formed on said ink-absorbing layer, wherein said porous polymer layer comprises at least one polymer selected from the group consisting of cellulose derivatives, vinyl-series polymers, and polysulfone-series polymers (claim 18).

Hamada teaches with respect to the porous membrane that "The mean pore size is 0.002 to 0.35 μm ...". Column 7, lines 48-49. Hamada also teaches that "A conventional additive or additives may be added to the dope ..., examples of the additive including ... coating performance improvers ...". Column 10, lines 32-36. Regarding the process for producing the porous membrane, Hamada teaches that "After the drying step, the coating is peeled off from the substrate to give a highly transparent porous membrane or film." Column 11, lines 46-48. It should be noted that the resultant membrane is used as "... a recording sheet .... By way of example, when the porous membrane or film is applied as an ink image-accepting layer of a recording sheet for use in an ink jet recording system or the like, the absorption of ink can be improved.". Column 12, lines 8-17. Still further, Hamada indicates that "As the substrate, there may be mentioned paper, ... nonwoven fabric, plastic film, ... A preferred substrate is a release paper, a single-layer or composite film which at least comprises a plastic film." Column 10, lines 44-46. The advantages of Hamada are said to be that "The recording sheet of the present

invention is excellent in ink absorption, water resistance and antiblocking property and good in sharpness of images ...". Column 17, lines 61-63.

Harasawa discloses "A recording sheet comprising a substrate and a colorant absorbing layer which has a structure having porous inorganic oxide particles bonded by a binder which is present in an amount of from 5 to 50 wt. % based on the porous inorganic oxide, formed on the substrate, wherein said colorant absorbing layer contains an organic acid with the first acid dissociation exponent of at most 5, which has an aromatic nucleus or at least two carboxyl groups.". Claim 1. Harasawa states that "... the colorant absorbing layer is a porous layer ...". Column 3, lines 3-4. "As the binder, an organic ... polyvinyl alcohol ... [or] ... hydroxy cellulose ... may be employed." Column 3, lines 61-64. It should be understood that "In the present invention, such an organic acid is incorporated to the colorant absorbing layer, whereby a color change of the recording sheet can be prevented.". Column 1, lines 33-36. "Among such organic acids having aromatic nuclei, phthalic acid, isophthalic acid, terephthalic acid ... are preferred ... when used for printing by an ink jet printer.". Column 1, lines 62-67. "The content of the above organic acid is preferably from 0.05 to 7.5 wt %, based on the weight of the colorant absorbing layer.". Column 2, lines 59-61. Harasawa intends to provide a recording sheet excellent in ink absorption as well as in the fixing of colorants, which undergoes no color change even when stored for a long period of time. Column 1, lines 15-23.

Iwasa discloses "A polyester fabric for ink jet recording comprising: a water-swelling resin (A) comprising a reaction product of a polycarbonate polyol and a polyisocyanate compound and having a sulfite group at the side chain and a number average molecular weight of 20,000 to 100,000; a water-swelling resin (B) comprising a reaction product of a polycarbonate polyol and a polyisocyanate compound and having a sulfite group at the side chain and a number average molecular weight of 5,000 to 15,000, wherein a blocking agent is reacted with active isocyanate groups positioned at both terminals of the water-swelling resin to mask the terminal isocyanates; and water-retentive microparticles (C); the fabric being heat-treated.". Claim 1. Iwasa mentions that "Polyester fabrics are [characterized by] light-weight and flexibility and have high durability and high resistance to tensile tearing and are therefore suitable as base materials for large printing products.". Column 1, lines 18-21. Further, "The additives used in the treating solution can be compounded to improve the printability of an ink jet ...". Column 8, lines 33-34. Iwasa provides a polyester fabric for ink jet recording which has high absorbance, uniform image, and high color density. Column 3, lines 36-39. However, the references fails to teach or suggest not only (i) a combination of the specific porous layer having the specific microphase separation structure resulted from phase conversion and the specific separability from the substrate with the organic acid but also (ii) a combination of the specific porous support and the organic acid.

As noted above, Hamada fails to teach or suggest the organic acid required by the present claims, much less the important role thereof. Furthermore, although

Hamada recites that the coating is peeled off from the substrate to give a highly transparent porous membrane or film, the peeled off membrane is subject to recording. Also, the Harasawa reference fails to teach the porous layer having the specific microphase separation structure resulted from phase conversion and being separable from the substrate. In particular, Harasawa fails to teach the role of the organic acid in combination with the microphase separation structure comprising the hydrophilic polymer resulted from phase conversion. Iwasa does not teach or disclose the porous layer or the organic acid at all!

It should be noted that the structure and composition of the color absorbing layer of Harasawa differ significantly from those of the ink-absorbing layer having the microphase separation structure resulted from phase conversion of Hamada and the polyester fabric of Iwasa, respectively, since the color absorbing layer of Harasawa is required to be porous inorganic oxide. Thus Harasawa would not be combined reasonably with Hamada and Iwasa, and the combination (i) would not be predicted from the references.

Since the references clearly fail to teach or suggest the combination of a porous plastic sheet or a fabric and an organic acid, the combination (ii) would not be predicted from the references.

Accordingly, none of the subject matter embraced by the present claims is derivable by any combination of the Hamada, Harasawa, and Iwasa references.

The present invention provides unexpected advantages. That is, since the sheet of Comparative Example 1 of the present specification comprises polyethylene terephthalate film, the sheets of Hamada and Iwasa correspond to the sheet of Comparative Example 1. As is apparent from Table 1 of the present specification, Comparative Example 1 does not satisfy all of the Ink absorption, Water reesistance-1, Image-definition, and Blocking resistance standards. Further, since the colorant absorbing layer of Harasawa is a structure having porous inorganic oxide particles bonded to a little amount of binder, separating the layer from the substrate causes drop-outs of the particles. And furthermore, since the role of the organic acid of Harasawa is to prevent color change in the layer comprising essentially a large amount of inorganic particles, the color changing properties are clearly irrelevant to the surface gloss, image-sharpness, color reproducibility , and antiblocking properties. See the specification, lines 1-8 on page 6 and lines 15-18 on page 35. Thus the improvements in the surface gloss, image-sharpness, and color reproducibility could not be predicted from the Harasawa disclosure.

In contrast, in accordance with the present invention, surface gloss, image-sharpness, color reproducibility, and antiblocking properties can be remarkably improved. These are clearly proved by Examples 1-3 in which all of Ink absorption, Water resistance-1, Image-definition, Blocking resistance, and Interlayer strength are significantly improved. Thus, these advantages of the present invention would never be predicted from the references of record.

Conclusion

If the Examiner has any questions concerning this application, he is requested to contact Richard Gallagher, Reg. No. 28,781, at (703) 205-8008.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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GMM/RG
Attachment: Version with Markings to Show Changes Made

Version with markings to show changes made:

1. (twice amended) An image-receiving sheet comprising (1) a laminate in which a porous layer is formed on at least one side of a substrate, wherein the porous layer of the laminate is separable from the substrate of the laminate and the adhesion strength between the porous layer of the laminate and the substrate of the laminate is 1 to 500 g/15mm and satisfies the equation $|Fp-Fn|<150$ g/15mm wherein Fn is the adhesion strength between the porous layer and the substrate in the non-imaged areas and Fp is the adhesion strength between the porous layer and the substrate of in the imaged area, and wherein the porous layer of the laminate further comprises a hydrophilic polymer and has a microphase separation structures resulted from phase conversion, or (2) a porous support of a porous plastic sheet or a fabric, said porous support having at least a porous surface, wherein the porous layer of the laminate (1) or the porous support (2) contains an organic acid having a solubility of 0.01 to 2 g in 100 g of water at 20°C.

6. (twice amended) The image-receiving sheet according to claim 1 **[5]**, which contains 1 to 100 parts by weight of the organic acid relative to 100 parts by weight of the hydrophilic polymer.

7. (twice amended) The image-receiving sheet according to claim 1 **[5]**, wherein the hydrophilic polymer is at least one member selected from the group

consisting of a cellulose derivative, a vinyl-series polymer, and a polysulfone-series polymer.

9. (twice amended) The [An] image-receiving sheet according to claim 1, which comprises a substrate and a porous layer formed on at least one side of the substrate, wherein said porous layer comprises at least one member selected from the group consisting of a cellulose derivative, a vinyl-series polymer, and a polysulfone-series polymer [and wherein said porous layer has a microphase separation structure resulted from phase conversion] and wherein said porous layer contains 2 to 100 parts by weight of an aromatic dicarboxylic acid relative to 100 parts by weight of the polymer.

16. (twice amended) The image-receiving sheet according to claim 1, [15, wherein the fabric is] comprising a porous support of a woven or non-woven fabric.